

Friday Flyer - June 1, 2012

Hello Mentors and Teachers!

CENTER SPOTLIGHT: Boston Area QuarkNet Center (Brown and Northeastern University)

<http://physics.bu.edu/quarknet/>

Wondering how to keep your workshops fresh and exciting after having met for many years? Contact Ulrich Heintz or George Alverson for ideas from Boston.

One of the original QuarkNet centers started in 1999, the strong core of returning teachers typically meets at the historic Roxbury Latin School. They hold a two- to three-day workshop each summer followed by several single-day workshops during the academic year. The meetings consist of talks by mentors about the latest news from the LHC and other experiments. The center also participates in particle physics masterclasses each spring. Since two of the teachers are QuarkNet fellows, they often pilot new activities. In August 2011, the teachers participated in an LHC workshop developed by the LHC fellows. Staff gained tremendous feedback from these teachers that enabled us to refine the workshop. More recently, Rick Dower showed data obtained from radioactive sources (Tl-204, Sr-90, Cs-137, Na-22) with his beta spectrograph (obtained from The Science Source in Maine). Plots show the spread of energies of the emerging beta particles that prompted Pauli to suggest the existence of the neutrino.

News from QuarkNet Central

Going to a new school or is your school changing e-mail addresses? As the academic year winds down, please update your contact information with your mentor. We don't want anyone to miss out on opportunities such as Boot Camp and CERN's High School Teacher program.

Detector Talk (In the first flyer of the month, we will talk about components of the cosmic ray muon detectors.) Let's start at the source of the signal—the scintillating plastic. We order 100 or more pieces of scintillating plastic each year from Eljen Technology in Sweetwater, Texas. They make a heated mixture polyvinyltoluene and organic fluors (fluorescent chemicals), pour it out in a sheet to a thickness of a little more than 1/2 inch, rough cut the sheet into 10" x 12" pieces, and crate and ship them to Fermilab's Lab 6. The edges on each piece are polished on a special machine with a diamond cutting head to make sure the light generated from the energy of a muon is reflected efficiently internally. Next they go to Lab 8 to have one corner milled on an angle and a thickness of exactly 1/2" where a round acrylic "cookie" is glued to provide the interface to the 1" diameter window on a photomultiplier tube. The wrappings that cover the scintillator—heavy-duty aluminum foil and lightproof wrap—come from huge rolls in Lab 6. This material is the same as that used in the large Fermilab detectors.

Oh where, oh where have those detectors gone?

With hundreds of detectors in classrooms, it is important to keep user agreements up to date. We make detectors available to QuarkNet teachers free of charge with the understanding that students use them for scientific investigations. When users upload data and students create posters, we have evidence of their work that we share with NSF and DOE. However, when comparing our inventory to data upload records, we find many detectors missing in action. If you are using the detector but not uploading data, please send e-mail to your staff teacher reporting on the work your students have done. If you have retired, changed teaching assignments or for some other reason are not using a detector, please contact your mentor or staff teacher so that we can pick it up and reassign it to someone else via a user agreement. We have a waiting list, so we can always find a good home for returned detectors.

Ole Miss is doing a LIGO e-Lab workshop June 11-12. You all can try out the e-Lab that investigates seismic activity at <<http://www.i2u2.org/elab/ligo/home/project.jsp>>. Data show teachers are most successful users after they attend a workshop. Contact Dale Ingram at ingram_d@ligo-wa.caltech.edu to schedule one.

Venus Transit- A rare astronomical event will occur next week. On June 5, starting at 6:05 PM EDT, Venus will transit across the face of the Sun. If you miss it this year, you will have to wait until 2117 to see it again. Check out where you and your students might be able to view this historic event. Perhaps at your mentor's university or lab? You might also check with local amateur astronomer groups. This link will give you local transit times.
<http://transitofvenus.nl/wp/where-when/local-transit-times/>

Particle Physics Experiment Roundup

LHC Report: Back to record performance

<http://cdsweb.cern.ch/journal/CERNBulletin/2012/22/News%20Articles/1450229?ln=en>

"The technical issues that caused a rocky re-start after the technical stop and a relatively low performance of the machine have been tackled and resolved in the past days. The LHC is back to record collision rates and matching the 2011 data set now seems within reach for the summer conferences."

CMS recently discovered a new form of the Xi or "cascade" particle.

<http://cms.web.cern.ch/news/observation-new-xib0-beauty-particle>

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